Arizona Science Standard Performance Level Descriptors
High School

Exceeds the Standard – Students who score in this level illustrate a superior academic performance as evidenced by achievement that is substantially beyond the goal for all students. Students who perform at this level demonstrate a wealth of knowledge, skills, and abilities in fulfillment of the science standard. They can specify the requirements of a valid, scientific theory, evaluate the effectiveness of conservation practices and preservation techniques, and describe the molecular basis of heredity in viruses and living things, including DNA replication and protein synthesis.

Meets the Standard – Students who score in this level demonstrate a solid academic performance on subject matter as reflected by the science standard. Students who perform at this level are able to develop questions from observations that transition into testable hypotheses, predict the outcome of an investigation, design an appropriate written plan of action for testing a hypothesis, interpret data, and evaluate whether the data supports a proposed hypothesis. They can describe the purposes and processes of cellular reproduction, analyze the relationships among nucleic acids (DNA, RNA), genes, and chromosomes, analyze the degree of relatedness among various species, and explain how genotypic and phenotypic variations can result in adaptations that influence an organism's success in an environment.

Approaches the Standard – Students who score in this level show partial understanding of the knowledge and application of the skills that are fundamental for proficient work. Students who perform at this level show some understanding of the science standard's concepts and procedures by evaluating scientific information for relevance, demonstrate safe and ethical procedures, produce graphs that communicate data, identify the relationships among organisms, and describe the levels of organization of living things. Some gaps in knowledge and skills are evident and may require additional instruction and remediation in order to achieve a satisfactory level of understanding.

Falls Far Below the Standard – Students who score in this level may have significant gaps and limited knowledge and skills that are necessary to satisfactorily meet the state's science standard. Students will usually require a considerable amount of additional instruction and remediation in order to achieve a satisfactory level of understanding.

Students at the "Exceeds the Standard" level generally know the skills required at the "Meets" and "Approaches" levels and are able to:	Students at the "Meets the Standard" level generally know the skills required at the "Approaches" level and are able to:	Students at the "Approaches the Standard" level generally know and are able to:
Process • Specify the requirements of a valid, scientific explanation (theory), including that it be: logical, subject to peer review, public, and respectful of rules of evidence. • Evaluate the effectiveness of conservation practices and preservation techniques on environmental quality and biodiversity. • Analyze the costs, benefits, and risks of various ways of dealing with the following needs or problems: various forms of alternative energy, storage of nuclear waste, abandoned mines, greenhouse gasses, and hazardous wastes. **Content** • Describe the molecular basis of heredity, in viruses and living things, including DNA replication and protein synthesis.	**Process** • Develop questions from observations that transition into testable hypotheses. • Predict the outcome of an investigation based on prior evidence, probability, and/or modeling. • Design an appropriate protocol (written plan of action) for testing a hypothesis. • Interpret data that show a variety of possible relationships between variables. • Evaluate whether investigational data supports the proposed hypothesis. • Evaluate the design of an investigation to identify possible sources of procedural error. • Propose further investigations based on the findings of a conducted experiment. • Explain the process by which accepted ideas are challenged or extended by scientific innovation. • Analyze the use of renewable and nonrenewable resources in Arizona. **Content** • Analyze mechanisms of transport of materials into and out of cells. • Describe the purposes and processes of cellular reproduction. • Analyze the relationships among nucleic acids (DNA, RNA), genes, and chromosomes.	**Process** • Evaluate scientific information for relevance to a given problem. • Demonstrate safe and ethical procedures in all science inquiry. • Identify the resources needed to conduct an investigation. • Use descriptive statistics to analyze data. • For a specific investigation, choose an appropriate method for communicating the results. • Produce graphs that communicate data. • Evaluate how the processes of natural ecosystems affect, and are affected by, humans. • Describe the environmental effects of the natural and/or human-caused hazards. pollution, extreme weather • Support a position on a science or technology issue. **Content** • Identify the relationships among organisms within populations, communities, ecosystems, and biomes.

Students at the "Exceeds the Standard" level generally know the skills required at the "Meets" and "Approaches" levels and are able to:	Students at the "Meets the Standard" level generally know the skills required at the "Approaches" level and are able to:	Students at the "Approaches the Standard" level generally know and are able to:
	• Explain how genotypic variation occurs and results in phenotypic diversity. • Assess how the size and the rate of growth of a population are determined by birth rate, death rate, immigration, emigration, and carrying capacity of the environment. • Identify components of natural selection. • Explain how genotypic and phenotypic variation can result in adaptations that influence an organism's success in an environment. • Analyze how patterns in the fossil record, nuclear chemistry, geology, molecular biology, and geographical distribution give support to the theory of organic evolution through natural selection over billions of years and the resulting present day biodiversity. • Analyze, using a biological classification system, the degree of relatedness among various species. • Compare the processes of photosynthesis and cellular respiration. • Describe the role of organic and inorganic chemicals important to living things.	• Predict how a change in an environmental factor can affect the number and diversity of species in an ecosystem. • Diagram the energy flow in an ecosystem through a food chain. • Describe the levels of organization of living things.

These descriptors do not include all the skills and knowledge as contained in the Science Standard.